

CLAIMS

1. A method of producing a multilevel electronic device comprising:

- (a) providing a substrate of dielectric material having a set of surfaces;
- 5 (b) machining into said substrate from a said surface, thereby creating a set of first indentations, at a first level;
- 10 (c) depositing conductive material into said first indentations to create a set of first conductive features;
- (d) substantially filling said first indentations with dielectric material;
- 15 (e) machining again into said substrate from a said surface, thereby creating a set of second indentations, at a second level; and
- (f) depositing conductive material into said second indentations to create a set of second conductive features.

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25 2. The method of claim 1, wherein step (f) further includes machining, in at least one place, to said first level, thereby together with step (g) constructing at least one electrical connection between said first set of conductive features and said second set of conductive features.

30 3. The method of claim 1, further comprising:

- (a) machining again into said substrate and machining a via that intersects both a

5 said first conductive feature and a said second conductive feature; and

10 (b) 5 depositing conductive material into said via to electrically connect said first conductive feature to said second conductive feature.

15 10 4. The method of claim 1, wherein said first set of indentations and said second set of indentations are both machined in from a single major surface.

15 5 5. The method of claim 1, wherein said at least one major surface includes a first major surface and a second major surface and wherein said first set of indentations is machined in from said first major surface and said second set of indentations is machined in from said second major surface.

20 6. The method of claim 1, wherein said machining of said second level indentations includes removal of some of said dielectric material.

25 7. The method of claim 1, further including, prior to step (b), the step of coating said major surface of said substrate of dielectric material with process-removable material, so that when step (b) is performed said machining removes said process-removable material at said first indentations.

30 8. The method of claim 1, wherein a conductive seed layer is deposited over said major surface by sputtering, but is removed everywhere but in said

indentations by exposing said major surface of said substrate to a removal process.

9. The method of claim 1, wherein said step (d)
5 includes filling said first indentations with liquid, curable material and then curing said liquid, curable material to form a filling of substantially solid, dielectric material.

10 10. The method of claim 1, wherein said step (d) more specifically includes plasma depositing dielectric material into said first indentations.

15 11. The method of claim 1, wherein said step (d) more specifically includes filling said first indentations with paralyne by way of sublimation.

20 12. The method of claim 1, further including laminating said flexible multilevel electrical device to a second flexible electrical device, to form a new multilevel electrical device having an increased number of levels.

13. In an electrical device work piece having a major horizontal top surface, a method for creating a 5 vertical planar conductive feature, said method comprising:

(a) machining through said major horizontal top surface, to create a trench;

(b) plating at least a portion of one side of said trench with conductive material, thereby creating a vertical planar 10 conductive feature.

14. The method of claim 13, wherein said step of plating includes sputtering conductive material onto at 15 least one side of said trench by sputtering in a partially non-directional manner.

15. A flexible multilevel circuit having a thickness of less than 10 micrometers per level of 20 conductive features.